MONDAY, MAY 24TH, 1852.

THOMAS ROMNEY ROBINSON, D. D., PRESIDENT, in the Chair.

Mr. J. HUBAND SMITH exhibited a stone urn, with a glass urn, found in a tumulus at Dunadry, county of Antrim.

On its surface there was a rich, black, loamy soil, and the farmer on whose land it was, having resolved to spread it over the adjoining ground, proceeded to remove it for that purpose, and in doing so came to the cairn, in which he discovered, at a depth of three feet from the surface, on the eastern side, and lying horizontally, a human skeleton, having on its head a ring of lignite, and at the feet the stone urn, and a little glass ring. The urn was distinguished from those found hitherto, by having handles at the sides and a brass cover upon the top. The mound, which was exceedingly large, was now entirely effaced.

A vote of thanks was passed to Mr. Smith.

Sir William R. Hamilton read a supplementary Paper in illustration of his communication of the 8th of December last, on the connexion of Quaternions with continued fractions and quadratic equations.

In this paper he assigned the four Biquaternions which are the *imaginary* roots of the equation

$$q^2 = qi + j;$$

and showed that *these* were as well adapted as the two *real* roots assigned in his former communication, to furnish the real quaternion value of the continued fraction,

$$\left(\frac{j}{i+}\right)^x 0.$$

He also showed that when the continued fraction

$$u_x = \left(\frac{b}{a+}\right)^x 0$$

converges to a *limit*,

$$u = u_{\infty} = \left(\frac{b}{a+}\right)^{\infty} 0,$$

the two quaternions a and b being supposed to be given and real, then this limit u is equal to *that one of the two real roots of the quadratic equations in quaternions,*

$$u^2 + ua = b,$$

which has the lesser tensor; and gave geometrical illustrations of these results.

The *two real* quaternion roots of the quadratic equation, $q^2 = qi + j$, being, as in the abstract of December, 1851,

$$q_1 = \tfrac{1}{2}(1 + i + j - k),\ q_2 = \tfrac{1}{2}(-1 + i - j - k),$$

it is now shown that the *four imaginary* roots are

$$q_3 = \frac{i}{2}(1 + \sqrt{-3}) - k, \qquad q_4 = \frac{i}{2}(1 - \sqrt{-3}) - k,$$

$$q_5 = \tfrac{1}{2}(i + k) + \tfrac{1}{2}(1 - j)\sqrt{-3}, \quad q_6 = \tfrac{1}{2}(i + k) - \tfrac{1}{2}(1 - j)\sqrt{-3};$$

but that in whatever manner we group them, *two by two*, *even* by taking *one* real and *one* imaginary root, the formula

$$u_x = (1 - v_x)^{-1}(v_x q_1 - q_2), \text{ or } \frac{u_x + q_2}{u_x + q_1} = v_x,$$

where $v_x = q_2^{\,x} v_0 q_1^{\,-x}$, $v_0 = \dfrac{u_0 + q_2}{u_0 + q_1}$, and which is at once simpler and more general than the equations previously communicated, conducts still to values of the continued fraction u_x, or $\left(\dfrac{j}{i+}\right)^x 0$, which agree with those formerly found, and may be collected into the following period of six terms,

$$u_0 = 0,\ u_1 = k,\ u_2 = \tfrac{1}{2}(k - i),\ u_3 = k - i,\ u_4 = -i,\ u_5 = \infty,$$
$$u_6 = 0,\ u_7 = k,\ \&c.$$

In general it may be remembered that q_1, q_2, are roots of the quadratic equation $q^2 = qa + b$.

As an example of a continued fraction in quaternions which,

instead of thus *circulating*, *converges* to a limit, the general value of

$$u_x = \left(\frac{10j}{5i+}\right)^x c$$

was assigned for any arbitrary quaternion c, by the help of the quadratic equation

$$q^2 = 5qi + 10j;$$

and it was shewn that with only one exception, namely, the case when $c = (2k - 4i)$, the limit in question was (for *every other* value of c),

$$u = \left(\frac{10j}{5i+}\right)^{\infty} c = 2k - i.$$

The Rev. Dr. Todd read a paper on the Khorsabad inscriptions, by the Rev. Dr. Hincks. This was the sequel to a paper read on the 25th of June, 1849, and printed in the twenty-second volume of the Transactions of the Academy. To that paper, which was chiefly occupied with the ideographic element in the Assyrian inscriptions, and with chronological investigations respecting them, an appendix was added, in which the phonetic characters were arranged. It was maintained that they were all syllabic, and that the elementary syllables represented four vowels and seven different forms of combinations of a vowel and a consonant; all of which, however, were not in use in the case of every consonant, while some syllables had more than one representation.

Up to the date of the publication of this paper, it was maintained by all other writers on the subject that the elementary characters represented the letters of a Semitic alphabet, though it was not denied that some characters represented combinations of two others. After a considerable part of the present paper was written, Colonel Rawlinson, abandoning his former theory of the characters representing letters, proposed syllabic values for them; he, however, admitted only three